

CLAIMS

What is claimed is:

1. A DC to DC converter comprising:

an energy storage element comprising an energy storage element input and an energy storage element output, said energy storage element input coupled to receive a first power level and said energy storage element output providing a second power level;

a feedback circuit comprising a feedback input and a feedback output, said feedback input coupled to said energy storage element output; and

a regulator circuit comprising a regulator circuit feedback input and a regulator circuit output, said regulator circuit feedback input coupled to said feedback output and said regulator circuit output coupled to said energy storage element input, said regulator circuit regulating the input of said first power level to said energy storage element input;

wherein when a signal at said regulator circuit feedback input is above a threshold level said regulator circuit is disabled and when said signal at said regulator circuit feedback input is below said threshold level said regulator circuit is enabled.

2. The DC to DC converter of claim 1 further comprising a rectifier comprising a rectifier input and a rectifier output, said rectifier input adapted to receive AC mains power and an output coupled to a capacitor that provides said first power level.

3. The DC to DC converter of claim 1 wherein said energy storage element comprises a transformer comprising a primary winding coupled to said energy storage element input and a secondary winding coupled to said energy storage element output.

4. The DC to DC converter of claim 1 wherein said regulator circuit input comprises a first regulator circuit input terminal and a ground terminal, and said regulator circuit output comprises a first regulator circuit output terminal and said ground terminal, said regulator circuit comprising a switch comprising a first switch terminal, a second switch terminal and a control switch terminal, said first switch terminal coupled to said first regulator circuit output terminal, said second switch terminal coupled to said ground terminal, said regulator circuit further comprising a feedback block comprising block input and a block output, said block output coupled to said first regulator circuit input terminal and said block output providing an enable signal wherein said control terminal of said switch operates according to said enable signal.

5. The DC to DC converter of claim 1 wherein said feedback circuit comprises a zener diode coupled to an optocoupler.

6. The DC to DC converter of claim 1 wherein said regulation circuit operates at a fixed duty cycle depending on a voltage level of said first power level.

7. A power supply comprising:

a transforming element comprising a transforming element input and a transforming element output, said transforming element input coupled to receive a first power level and said transforming element transferring energy; and

a regulator circuit coupled to said transforming element input and said regulator circuit controlling the input of said first power level to said transforming element,

wherein when an output voltage or current of said transforming element is above a threshold level said regulator circuit preventing said transforming element from transferring energy and when output voltage or current of said transforming element is below a threshold level said regulator circuit allowing said transforming element to transfer energy.

8. The power supply of claim 7 further comprising a rectifier comprising a rectifier input and a rectifier output, said rectifier input coupled to receive an AC mains signal, and a capacitor comprising first and second terminals, said first and second terminals of said capacitor coupled to said rectifier output and said transforming element input.

9. The power supply of claim 7 further comprising a feedback circuit comprising a feedback input and a feedback output, said feedback input coupled to said transforming element output and said feedback output providing a signal indicative of the voltage or current of said transforming element to said regulator circuit.

10. The power supply of claim 7 wherein said feedback circuit comprises a zener diode coupled to an optocoupler.

11. The power supply of claim 7 wherein said transforming element comprises a transformer comprising a primary winding coupled to said transforming element input and a secondary winding coupled to said transforming element output.

12. The power supply of claim 7 wherein said transformation element comprises a transformer.

13. A regulator circuit comprising:

a feedback input;

a switch comprising a first terminal, a second terminal and a control terminal, said switch coupling said first and second terminals when a control signal is received at said control terminal;

an oscillator comprising an oscillator output that provides a duty cycle signal comprising a high state and a low state;

said control signal being provided when no feedback signal is provided at said feedback input and said duty cycle signal is in said high state.

14. The regulator circuit of claim 13 wherein said switch comprises a transistor.

15. The regulator circuit of claim 13 further comprising an over current blockregulator comprising an input coupled to first terminal of said switch and an output coupled to said control terminal of said switch.

16. The regulator circuit of claim 15 wherein said over current regulator terminates operation of said switch when a current input at said first terminal of said switch is above a current limit.

17. The regulator circuit of claim 13 wherein said regulator circuit comprises a monolithic device.
18. The regulator circuit of claim 13 further comprising a bypass output, a capacitor coupled to said bypass output and a current source coupled between said first terminal of said switch and said bypass output.
19. The regulator circuit of claim 18 wherein said current source provides current to charge said capacitor when said switch does not couple said first terminal to said second terminal.
20. The regulator circuit of claim 13 wherein a frequency of said duty cycle signal is increased when said feedback signal is received.
21. The regulator circuit of claim 13 wherein said duty cycle signal is not provided when said feedback signal is received.
22. The regulator circuit of claim 21 wherein said duty cycle signal is resumed substantially instantaneously with the removal of said feedback signal.
23. A power supply comprising:

an energy storage element comprising an energy storage element input and an energy storage element output, said energy storage element input coupled to receive a first power level;
and

a regulation circuit comprising a regulation circuit input and a regulation circuit output, said regulation circuit coupled between said energy storage element input and a source of said first power level,

wherein said regulation circuit preventing said energy storage element input from receiving said first power level when a current or voltage at said energy storage element input is at or above a predetermined threshold level.

24. The power supply of claim 23 wherein said energy storage element comprises a transformer.

25. The power supply of claim 23 wherein said regulation circuit comprises a monolithic device.

26. The power supply of claim 23 wherein said energy storage element comprises coupled inductors.

27. The power supply of claim 23 wherein said regulation circuit further comprises a switch comprising a first switch terminal and a second switch terminal, said first switch terminal coupled to said regulation circuit input and said second switch terminal coupled to said regulation circuit output, said switch coupling said first switch terminal to said second terminal

when said current or voltage at said energy storage element input is below said predetermined threshold level so that said energy storage element receives said first power level.

28. The power supply of claim 23 further comprising a rectifier comprising a rectifier input and a rectifier output, said rectifier input coupled to receive an AC mains signal and a capacitor coupled to said rectifier output, said capacitor providing said first power level.

29. The power supply of claim 23 wherein said regulation circuit further operates at a frequency comprising a plurality of cycles when said current or voltage at said energy storage element input is below said predetermined threshold level, said regulation circuit allowing said energy storage element input to receive said first power level for a first predetermined time period and preventing said energy storage element input from receiving said first power level for a second predetermined time period during each cycle.

30. The power supply of claim 29 wherein said regulation circuit further comprises a bypass output and said power supply further comprising a capacitor coupled to said bypass output, said capacitor being provided energy from said bypass output when said regulation circuit is preventing said energy storage element input from receiving said first power level.

31. A power supply comprising
a transforming element comprising a transforming element input and a transforming element output, said transforming element input coupled to receive a first power level; and

a regulation circuit comprising a regulation circuit input and a regulation circuit output, said regulation circuit coupled between said transforming element input and a source of said first power level,

wherein said regulation circuit preventing said transforming element input from receiving said first power level when a current or voltage at said transforming element input is at or above a predetermined threshold level.

32. The power supply of claim 31 wherein said transforming element comprises a transformer.

33. The power supply of claim 31 further comprising a rectifier comprising a rectifier input and a rectifier output, said rectifier input coupled to receive an AC mains signal and a capacitor coupled to said rectifier output, said capacitor providing said first power level.

34. The power supply of claim 31 wherein said regulation circuit further operates at a frequency comprising a plurality of cycles when said current or voltage at said transformation element input is below said predetermined threshold level, said regulation circuit allowing said transformation element input to receive said first power level for a first predetermined time period and preventing said energy storage element input from receiving said first power level for a second predetermined time period during each cycle.

35. The power supply of claim 34 wherein said regulation circuit further comprises a bypass output and said power supply further comprising a capacitor coupled to said bypass

output, said capacitor being provided energy from said bypass output when said regulation circuit is preventing said transforming element input from receiving said first power level.

36. The power supply of claim 31 wherein said regulation circuit comprises a monolithic device.

37. The power supply of claim 31 wherein said transforming element comprises coupled inductors.